

REMARKS

Claims 1-9 and 14 are amended, claims 31-40 are added and claims 10-13, 15 and 16 are cancelled herein. Claims 1-9, 14 and 31-40 are currently pending.

General Considerations

This invention relates generally to mine doors and more particularly to mine door leafs for relatively large mine doors. A mine door leaf of the present invention has a central core of a solidified composition and outer panels on opposite faces of the core. The core has a force-transmitting relationship with the panels resulting in an integrated stress-resistant structure. As a result, the mine door leaf is relatively lightweight for its size and is resistant to stresses of the type encountered in a mine environment, as will be discussed in more detail hereinafter.

Rejection of Drawings under 37 CFR §1.83(a)

The drawings stand objected to under 37 CFR 1.83(a) for failing to show the one or more filling openings in the door panel as recited in the claims. Support for the one or more filling openings in the door panel can be found in the specification at page 6, lines 14-17 ("It is introduced into the space 25 in the fluent state via one or more filling openings such as indicated at 35 in the frame side member 13 (Fig. 3)."). Figure 3 shows a filling opening in the door panel as identified by reference numeral 35.

Accordingly, applicants respectfully submit that the drawings are in proper form.

Rejection of Claims under 35 U.S.C. §112

Claims 2-9 and 14

Claims 2-9 and 14 stand rejected under 35 U.S.C. §112 second paragraph for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 2-9 and 14 have been amended to clarify the claim language and thereby obviate the Examiner's objections.

Accordingly, applicants respectfully submit that claims 2-9 and 14 satisfy 35 U.S.C. §112.

Rejection of claims under 35 U.S.C. § 102

Claim 1

Claim 1 is amended to further distinguish over the prior art, including U.S. Patent 3,334,464 (Charles). As amended, the claim specifies that applicants' mine door leaf is mounted for swinging between open and closed positions in a doorway in a mine passage, and that the door leaf comprises:

- a) a central core of a solidified composition,
- b) outer panels on opposite faces of the core,
- c) the core having a force-transmitting relationship with the panels constituting the panels and core as an integral stress-resistant structure resistant to stresses to which the door leaf is subjected in a mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight, and
- d) one or more hinge components on the leaf.

The intention of this amendment is to emphasize that applicants' door leaf is in fact used in a mine where it is

subjected to all of the harsh usage and environmental conditions in a mine, and to further emphasize that the door is an integral stress-resistant structure resistant to stresses to which the door leaf is subjected in the mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight.

Applicants' mine door, as defined by claim 1, is designed to be both strong and lightweight. Strength is needed so that the mine door can withstand the substantial air pressure forces exerted on a door in a mine. For example, the ventilating air in a mine creates substantial air pressure differentials across a closed door, one side of the door being at a relatively higher pressure and the other side at a relatively lower pressure. This differential creates substantial stresses in the door. Also, a mine door is subjected to concussive air forces resulting from intentional or unintentional roof collapses and explosions in the mine during the mining process. Concussion is not simply a single pressure from an expansion of gases or the movement of rock. As an explosion occurs at the mine face, for instance, the pressure is raised locally by the expansion of the explosive gases. Initially there is a shock wave caused by movement of air away from the site of the explosion. This movement creates a vacuum at the site of the explosion, which eventually causes the air to reverse direction toward the center of the explosion. This expansion and contraction of the air repeats in decaying cycles and subjects a mine door to repetitive push and pull forces. If the door is not resistant to such forces, it will fail.

In addition, mine doors are typically mounted in cantilever fashion, leaving each door leaf unsupported along its free vertical side (except where it contacts the lintel of the doorway frame) and along its lower edge (except where it is attached to the doorway frame), as shown in Fig. 10 of the pending application, for example. As a result, a mine door leaf is subjected to torsional forces and is prone to flex if not rigidly constructed. Flexing must be avoided, since this can lead to failure of the door, or at least deformation at the unsupported side of the door sufficient to cause substantial leakage past the door. Such leakage can have adverse consequences in terms of increased costs and ventilation problems. Structural strength and rigidity is also important so that the door can withstand the substantial forces required to open and close the door due to the air pressure differentials discussed above, and further to withstand the substantial abuse a door takes in a mine from passing equipment and personnel.

A lightweight door is also important for several reasons. First, a heavy door includes extra materials and therefore is more expensive. Second, a heavy door has more inertia than a lighter door, thus requiring greater opening and closing forces. In addition, heavy doors are harder to stop when moving, which can create risks to people and equipment around the door. Thirdly, a heavy door is more difficult to transport, handle and install. Applicants' door is strong, lightweight and suitable for use in a mine.

In short, amended claim 1 specifies that applicants' door leaf is actually mounted in a mine and subject to the stresses

in a mine, thus making it perfectly clear that more than just an intended use is involved.

Claim 1 stands rejected as being anticipated by U.S. Patent 3,334,464 (Charles). "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." MPEP 2131 (*quoting Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). Claim 1, particularly as amended, is submitted as patentable over Charles, which fails to show a door mounted in a mine, much less a door formed with a core having a force-transmitting relationship with the panels constituting the panels and core as an integral stress-resistant structure resistant to stresses to which the door leaf is subjected in a mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight.

Charles discloses a conventional door suitable for home or institutional use that is lightweight, durable and exhibits good acoustical qualities. (Charles, cl. 1, ll. 49-61). The Charles door comprises two rectangular facing sheets 4 and 6, a foam plastic core 8 and a peripheral frame 10, 12, 14 and 16. (Charles, cl. 3, ll. 33-40). The door is assembled by connecting three of the four peripheral frame channels 10, 12, 14 and 16 using two corner keys 18. (Charles, cl. 4, ll. 22-25). Next, the two rectangular facing sheets 4 and 6 are inserted into recesses 26 formed in the peripheral frame channels 10, 12, 14 and 16. (Charles, cl. 4, ll. 25-27). The remaining peripheral frame channel 10, 12, 14 and 16 is then attached using two additional corner keys 18. (Charles, cl.

4, ll. 27-29). Lastly, the molten foam plastic is poured into apertures 34 to completely fill the enclosed space and then cured using heat. (Charles, cl. 4, ll. 29-40). The foam plastic adhesively engages the inner surfaces of the peripheral frame channels, corner keys and panels. (Charles, cl. 4, ll. 1-3).

Charles fails to show a door mounted in a mine, much less a door having all of the features of the claimed invention and, in particular, the requirement that the panels and core be an integral stress-resistant structure resistant to stresses to which the door leaf is subjected in a mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight. On the contrary, Charles teaches a door for home or institutional use, not one for use in a mine. One of ordinary skill in the art would understand that a mine door must withstand the severe stresses described above and would not recognize the teachings of the Charles patent as being applicable to the harsh conditions in a mine environment.

Further, while the Charles door is characterized as being "durable," "durable" needs to be taken in the context in which it is used, unless otherwise defined. Since Charles fails to define "durable," it is necessary to evaluate the intended use of the door. Charles indicates that the door is intended for home or institutional use and, as a result, its durability needs to be evaluated under these conditions. A door manufactured to be "durable" in a home or institution is subjected to far less stress and abuse than a door manufactured for use in a mine. As noted above, a door manufactured for use in a mine has to be capable of withstanding

severe stresses associated with such use whereas a door manufactured for home or institution use does not.

Furthermore, Charles fails to discuss the type stresses his door is "durable" against. Applicants' claim a door leaf mounted in a mine and capable of withstanding the stresses to which the door leaf is subjected in a mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight. Since the Charles door was for home and institutional use, it certainly will not be subjected to the stresses of a mine.

As a result, Charles fails to teach each and every element of applicants' claimed invention as defined by amended claim 1. The reference does not disclose or suggest a mine door leaf mounted in a mine, and it does not disclose or suggest a mine door leaf with the panels and core being an integral stress-resistant structure resistant to stresses to which the door leaf is subjected in a mine, including torsion-induced stresses, shear and bending stresses, and stresses induced by its own weight. Accordingly, applicant requests that the rejection of claim 1 be withdrawn.

Claims 2-9, 14 and 31-37 depend from amended claim 1 and are believed to be allowable for the same reasons as claim 1.

Claims 2 and 33 recite a mine door leaf wherein the force-transmitting relationship is established by adhesion and mechanical coupling or by mechanical coupling of the core to the panels. Similarly, claims 7 and 36 recite a mine door leaf wherein the force-transmitting relationship is established by adhesion and mechanical coupling or by mechanical coupling of the filling to the door panels. Charles does not teach a door leaf where a force-transmitting relationship is established by mechanical coupling of the core

(or filling) to the panels. In Charles, the "facing sheets 4, 6 and frame channels 10, 12, 14 and 16 are firmly held together as a unit solely through the adhesive action of the core. No screws, bolts or other fasteners or secondary adhesives are relied upon." (Charles, cl. 4, ll. 8-12 (emphasis added)). As a result, the prior art of record, and in particular Charles, fail to teach each and every element of applicants' claimed inventions in that none of them teach a mine door leaf with a force-transmitting relationship established at least in part by mechanical coupling of the core or filling to the panels. Accordingly, claims 2, 7, 33 and 36 are patentable for these additional reasons.

Claim 31, also depending from claim 1, specifies that the mine door leaf is mounted on a doorway frame in the mine passage, the frame being of the type comprising a column yieldable to accommodate mine convergence without permanent deformation of the doorway frame (see p. 3, lines 11-19 of application). This claim further emphasizes the mine environment in contrast to the Charles door.

Claims 38-40, directed to a mine door installation, are also added and are believed to be patentable for the reasons discussed above in regard to claims 1 and 31.

CONCLUSION

In view of the above, applicants respectfully request allowance of claims 1-9, 14 and 31-40. The undersigned requests a telephone call from the Examiner if this would expedite allowance of the application.

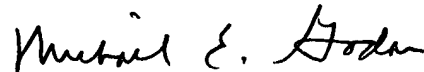
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Respectfully submitted,

A handwritten signature in cursive script that reads "Michael E. Godar". To the right of the signature is a long, diagonal slash mark.

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